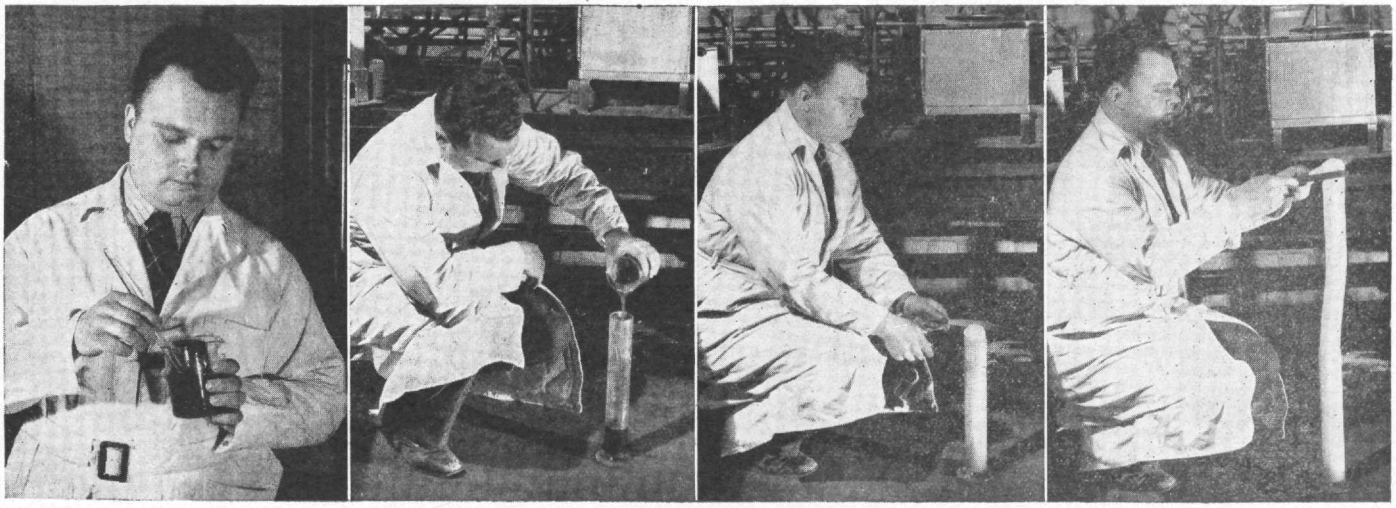

—All illustrations Courtesy General Electric.

Engineering Shorts

Plastic Foam Grows By Itself

The new type of foam plastics is a resin closely resembling molasses. Within two to five minutes after it is mixed, it begins to foam and grow. In practically no time at all it develops into a coarse-textured mass that is lighter than rock wool, glass, or cork, and lower in heat conductivity than any of these three.

What is really astonishing is the fact that the resin is also self-curing. The mixture itself generates the small amount of heat that is needed. As soon as the foam stops growing it is ready for use. These plastics weigh less than two pounds per cubic foot.

Wartime uses of the plastic foam are secret. After the war, the substance promises to have many applications, especially where insulation is required.

In the strip of pictures at the top of the page, a chemist mixes the resin, and pours it into a glass beaker. Within two minutes the material begins to rise; continues to grow at the rate of an inch a second; cures at once so that the rod of completed plastics can be held aloft.

Silicone Rubber

Silicone rubber retains its elasticity at temperatures as low as minus 60 derees Fahrenreit, and as high as 575 degrees F. Moreover, it is not affected by ozone, corona and ultraviolet light agents that deteriorate other types of rubber. At the present, its greatest uses are as Navy searchlight gaskets and airplane turbosupercharger gaskets.

These trays of silicone rubber gaskets are ready to be cured by heating. The new material has

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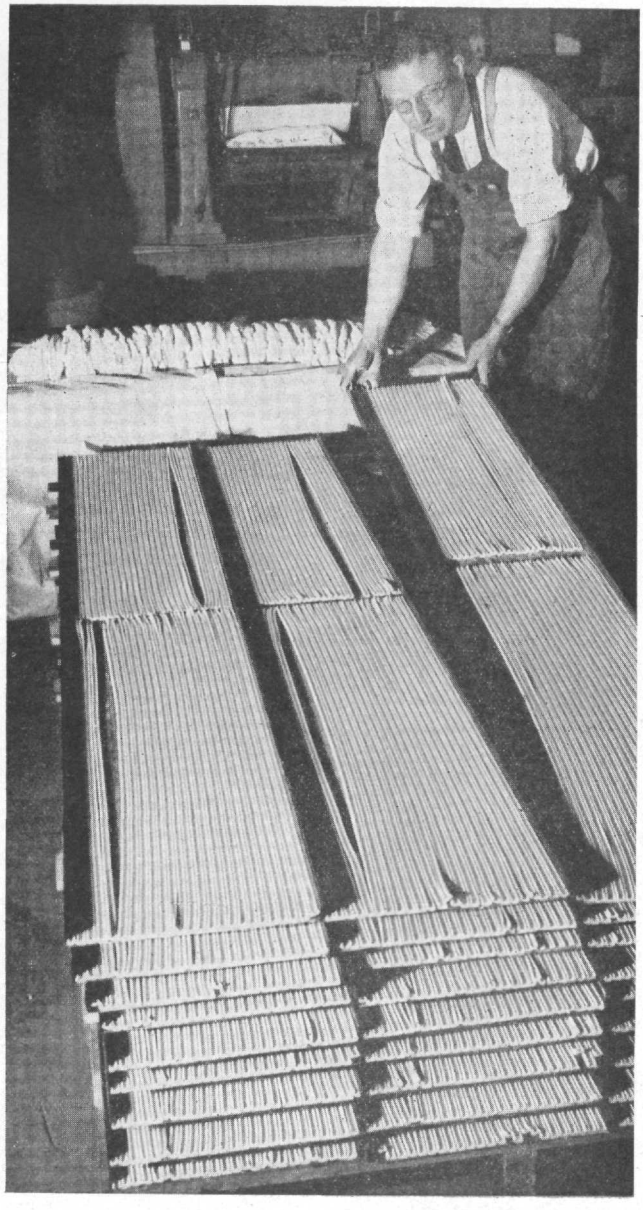
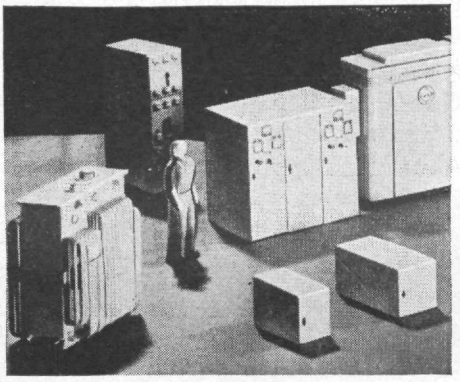


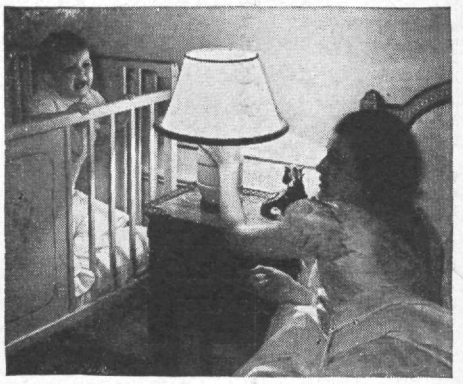
"DESK-TOP" PLANT LAYOUTS

HOW THEY HELP SOLVE SUBSTATION PROBLEMS VISUALLY—SAVE TIME, PAPER WORK! TYPICAL OF A-C'S AID TO INDUSTRY!

1 Allis-Chalmers' new "Unit Sub Builder" set simplifies one of the most complicated jobs that industrial engineers face—modernization of power distribution for better economy and efficiency.

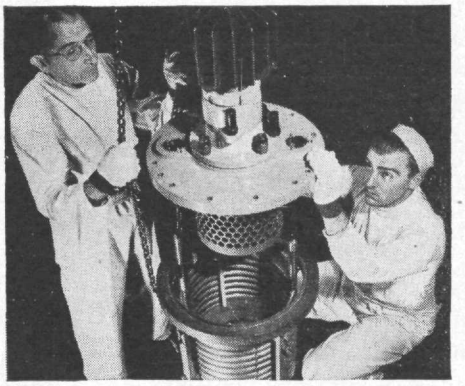


2 With accurate scale models of A-C unit substation apparatus, engineers can see just what equipment they need—how it should be arranged—without bogging down in complex charts, tables and diagrams.

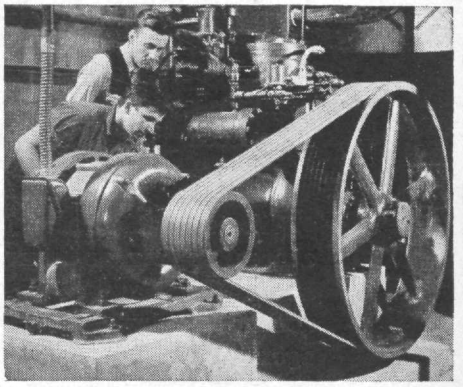


3 Uninterrupted and efficient power distribution to homes and plants is vital and A-C's visual planning helps eliminate chance for error. Unit substation planners can better meet the exacting needs of war production.

4 Helping produce super fuels for planes is the job of A-C Gas Turbines—another Allis-Chalmers' aid to industry. Today, A-C has more industrial gas turbines in use than all other companies combined.

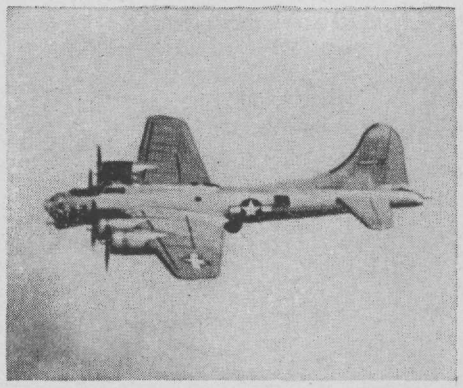


5 Developed and introduced by Allis-Chalmers, single anode Excitron rectifiers provide simple, reliable conversion from a-c to d-c power for industrial applications—250 volts and up.



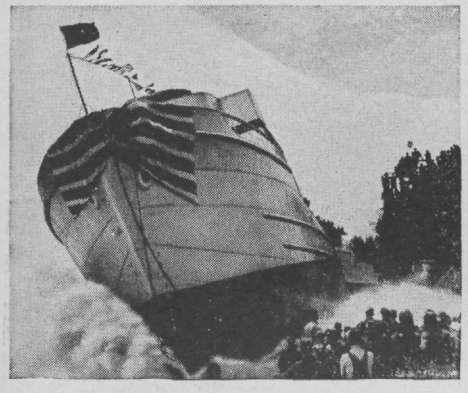
6 Still another basic A-C development is the Texrope Drive. Throughout industry, this Multiple V-Belt Drive, invented by A-C, transmits mechanical power that gives U.S. its clothing, food, 1001 necessities.

7 Even airports and highways are built with the aid of Allis-Chalmers. A-C supplies U.S.A.'s largest line of rock-crushing and milling machinery . . . tractors, graders and bulldozers for all types of construction.

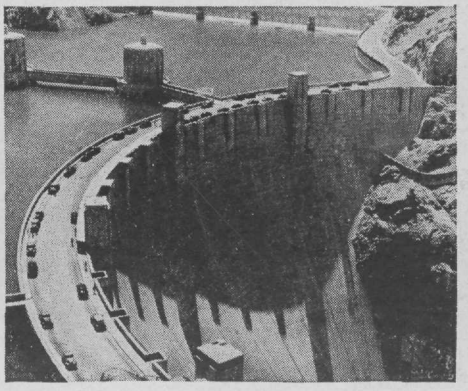


8 The ability of Allis-Chalmers to solve almost any kind of industrial problem was demonstrated two years ago when turbo-superchargers were urgently needed by the U. S. Army for bombers and fighters.

9 Not only did Allis-Chalmers build a complete new supercharger plant in record time, but quickly trained hundreds of inexperienced workers to mass produce these highly specialized precision machines.



10 A-C engineering reaches into every industry. If you are a shipbuilder, A-C can supply you with steam turbines, pumps, motors, condensers, many other types of marine equipment.



11 At Boulder Dam, Niagara and Grand Coulee, A-C hydraulic turbines generate power for factories, homes, farms. Call on A-C's vast experience for help with *your* production problems!

12 Meet Mr. Bernard Pagels, one of many thousands of skilled craftsmen who insure the integrity and precision workmanship of Allis-Chalmers' products—**over 1600 for U. S. Industry!**

Allis-Chalmers Manufacturing Co., Milwaukee 1, Wis.

EXPERIENCE PAYS BIG! Today, with Industrial Background and Skill more vital than ever, it's important to know the Company with the widest range of Engineering Experience...

ALLIS-CHALMERS

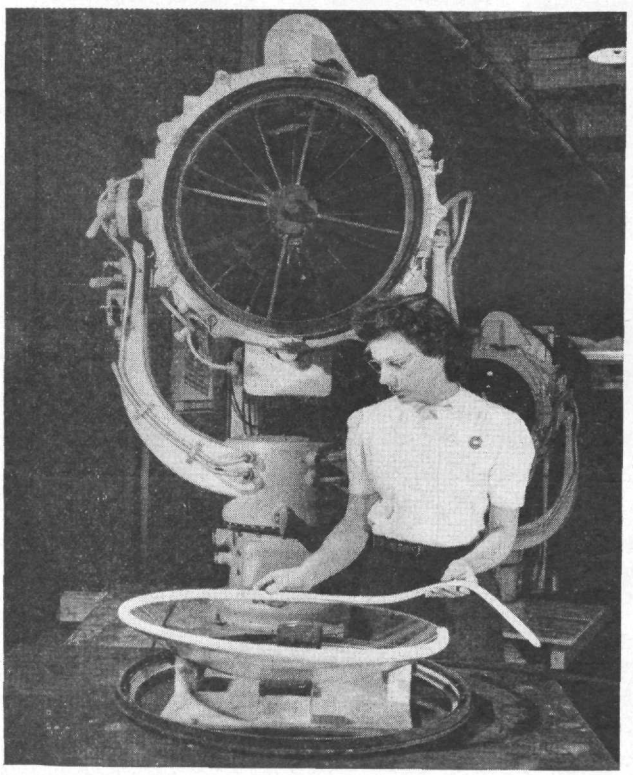
PRODUCER OF THE WORLD'S LARGEST LINE OF MAJOR INDUSTRIAL EQUIPMENT

A-C

Tune in the BOSTON SYMPHONY Every Saturday over the Blue Network Coast-to-Coast 8:30 P.M. E.W.T.

several unusual properties and someday when its tensile strength is improved, it will be used for tires, jar rings, and garden hose.

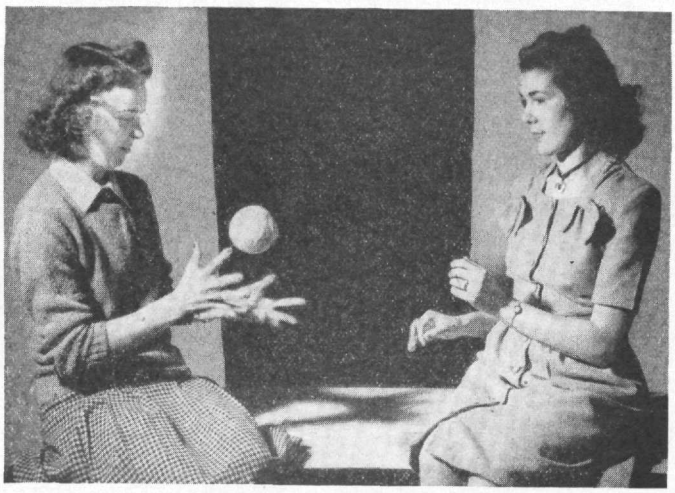
An engineer in an electrically heated flying suit demonstrates the flexibility of silicone rubber, in a room where the temperature is minus 60 degrees F.



A gasket of General Electric's new silicone rubber, which remains elastic even at the high temperatures encountered near a high-intensity electric arc light, is applied to the lens of a 24-inch Navy searchlight.

A by-product of the research in silicone rubber is a curious material nicknamed "bouncing putty." It looks and feels like putty, and can be pulled and kneaded in the same way. Yet when rolled in a ball, and dropped on a hard surface, it bounces like rubber,—a putty ball would flatten

The girls in these pictures, above and below, are demonstrating the peculiar properties of "bouncing putty."



out. This may suggest a postwar use in the golf ball industry.

Ghost Photos

Did you ever want to take a picture of the skeleton in the closet, the spook in the attic, or the little man who wasn't there? By combining an old photographic technique known as the Schlieren method with ultramodern, ultra-high-speed equipment which General Electric engineers developed, it is possible to photograph such fleeting things as the air disturbance caused by the flight of a bullet.

How death begins a journey is shown in the photograph taken by the new shadowgraph technique. When a gun to the left of the camera was fired, it expelled the mass of air that was in the barrel ahead of the bullet, then the bullet itself. Finally the hot gases that give the bullet its speed are expelled. So fast was the picture taken—in less than one-millionth of a second—that the sound wave produced by the explosion hasn't had time to form. The heavy curves in the center of the picture are the image of the shock wave. The V-shaped pattern behind the bullet is the effect produced by a violent shock.

(Please turn to next page)

TRACKING DOWN TROUBLE

This laboratory, ready to move anywhere on short notice, runs down "crimes" against good telephone service. Finding these threats is one of the many jobs of the Bell Telephone Laboratories' scientists. The "criminals" are such things as threads of lint, traces of acids, or sulphur compounds in the air—any of which might damage telephone equipment.

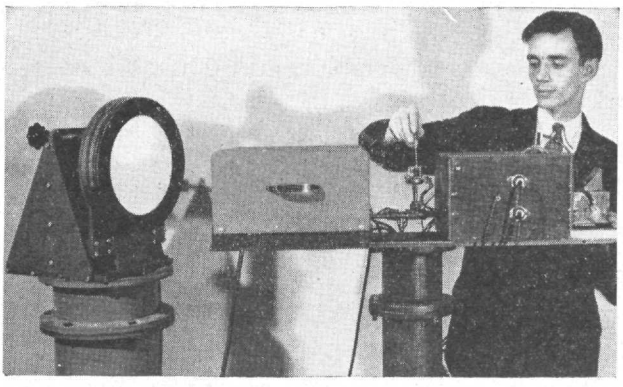
In their interesting war work, Bell Laboratories' scientists have been on a new kind of hunt. They have tracked down different materials for those hard to get, found others that would serve in special conditions, and have detected in captured equipment the kinds of material the enemy uses.

These are some examples among many of the ways Bell System research is helping to serve America at war.

BELL TELEPHONE SYSTEM

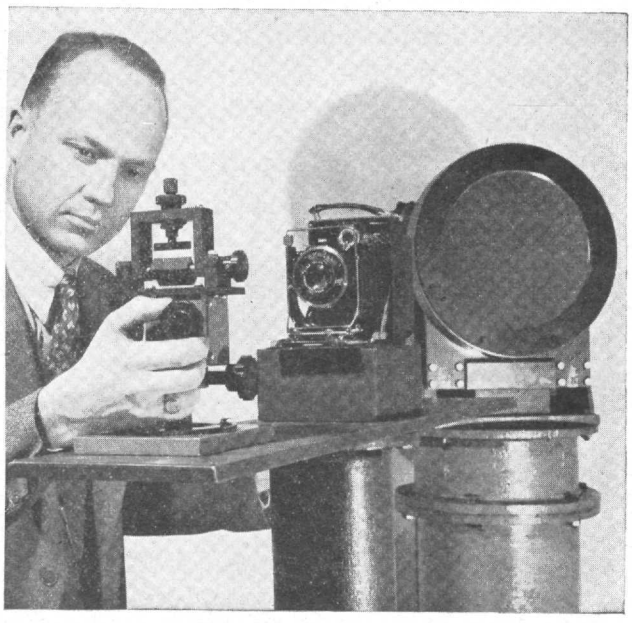
"Service to the Nation in Peace and War"

The new technique is based on the development over the past two years of special electronic devices which not only supply the illuminating flash at the right instant, but also give such a short exposure that the light from the flash has time to travel only 1000 feet.



In the new photographic method, a steady streak of light is directed to a mirror like that at left, is modified by the subject, is reflected by a second mirror and is finally picked up by the photographic plate.

Norman F. Barnes, one of the men who developed the highspeed photographic technique, adjusts the knife-edge assembly through which light that has been affected by the subject being photographed passes to the photographic plate. The new method makes it possible to picture the flow of air.



How Television Got Its Electronic "Eyes"

As revolutionary as airplanes without propellers—that's how much electronic television differs from the earlier mechanical television!

Whirling discs and motors required for mechanical television were not desirable for home receivers. Pictures blurred and flickered.

But now, thanks to RCA research, you will enjoy all-electronic television, free from mechanical restrictions—"movie-clear" television with the same simplicity of operation as your radio receiver.

Such "let's make it better" research goes into everything produced by RCA.

At RCA Laboratories, world-famous scientists and engineers are constantly seeking new and better ways of harnessing the unbelievable forces of nature . . . for mankind's greater benefit.

Electronic television is but one example of the great forward strides made possible by RCA research—opening the way for who knows what new miracles?

When you buy an RCA radio or phonograph or television set or any RCA product, you get a great satisfaction . . . enjoy a unique pride of ownership in knowing that you possess the finest instrument of its kind that science has yet achieved.

Dr. V. K. Zworykin, Associate Research Director and E. W. Engstrom, Director of Research at RCA Laboratories, examining the Iconoscope or television "eye"—developed in RCA Laboratories for the all-electronic television system you'll enjoy tomorrow.

RADIO CORPORATION of AMERICA

PIONEERS IN PROGRESS

RCA